

AMENDMENTS TO THE DRAWINGS

By this Amendment, Applicants amend the drawing to add new Figs 6-9. The Office Action objected to the drawings under 37 C.F.R. § 1.83(a). By this Amendment, Applicants submit drawings depicting the structures claimed that the Examiner has requested. The drawings are fully supported in the specification and claims as originally filed and no new matter has been added. Applicants respectfully request that the Examiner withdraw the rejection.

REMARKS

Claims 25-53 are pending. By this Amendment, claim 26 is cancelled, claims 25 and 53 are amended and new claims 54-59 are added.

Telephone Interviews

Applicants thank Examiner's Chang and Allen for their time and courtesy in the telephone interviews of December 16, 2008 (Ex. Chang), December 23, 2008 (Ex. Allen), January 9, 2009 (Ex. Allen) and February 3, 2009 (Exs. Chang and Allen.) During the interviews Claims 25-53 were discussed and Claim Objections to claims 25, 31, 37 and 53 were discussed. Proposed amendments to the claims were discussed.

Amendments to the Specification

Applicants have amended the specification to add a brief description of the new drawings added at the request of the Examiner. The amendments to the specification are fully supported in the specification and claims as originally filed and no new matter has been added.

Claim Objections

Inspection Radiation and Observation Radiation

The Office Action objected to claims 25-53 indicating that the objection was "because of the following informalities". The Office Action objected to the phrase "inspection radiation" and to the "phrase observation" radiation in claims 25 and 53 as "confusing since it is not clear what is considered to be inspection and what is considered to be observation". The Office Action also indicates "the two radiations are therefore being examined as arbitrary radiations." Applicant

respectfully traverses the objection. The terms “observation radiation” and “inspection radiation” are defined in the specification, for example, on page 1, lines 19-25. Reference to the specification of the application as filed, clearly indicates that the observation radiation is radiation, usually in the ultraviolet spectrum, that is used to create images of, for example, inspection mask or wafers. It is well known to those of ordinary skill in the art, that short wavelengths of light are currently used for viewing of master wafers because the size of the details of the master wafers have become so small that short wavelengths of light are needed to resolve the details of the tiny integrated circuit structures that are present on the wafers. The application as filed also indicates that the inspection radiation is used for autofocusing and in many cases is at wavelengths between 650 and 820 nanometers. Therefore, Applicant respectfully submits that these terms are not confusing to one of ordinary skill in the art who has read the specification. Further, Applicants have amended claims 25 and 53 to further distinguish the meaning of the objected to terms. Applicants respectfully request that the Examiner withdraw the objection.

Applicant also respectfully objects to the Office Actions statement that the two radiations are being examined as “arbitrary radiations.” “During examination, the pending claims must be given their broadest reasonable interpretation *consistent with the specification*.” (emphasis added) MPEP 2111. MPEP 2111 continues: See also *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997) (The court held that the PTO is not required, in the course of prosecution, to interpret claims in applications in the same manner as a court would interpret claims in an infringement suit. Rather, the “PTO applies to verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage as they would be

understood by one of ordinary skill in the art, *taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in applicant's specification.*"). (emphasis added). By examining the two radiations as “arbitrary radiations” the Office Action has given the claims an interpretation that is unreasonably broad and thus goes beyond the broadest reasonable interpretation of the claims. The effect of this unreasonably broad interpretation is to effectively ignore explicit limitations in the pending claims. The limitations “inspection radiation” and “observation radiation” must be given appropriate meaning. When one gives the “inspection radiation” and “observation radiation” their appropriate meaning as defined in the specification, the cited prior art does not anticipate or render obvious the present invention as claimed. Further, Applicants have amended claims 25 and 53 in order to further define the meaning of these terms in the language of the claims. Further still, Applicants have added new claims 54-59 further defining the Applicants’ invention with relation to these terms. As such, Applicants respectfully request that the objections and rejections be withdrawn and the courtesy of a second non-final Office Action based on the meaning of these terms.

Said Main Optics Being Corrected

The Office Action also objected to the phrase “said main optics being corrected”, in claim 25 and the phrase “corrected for predetermined observation radiation” in claim 53, as again, being confusing “since it is not clear what is be corrected (sic).” Applicants respectfully traverse the objection. As described in the specification, for example, at lines 19-26, the imaging optics are corrected so that they “ideally focus onto a sample to be inspected.” Further for example, page 1, line 28 through page 2, Line 33 discusses the correction aspects of the

invention. Thus when read in light of the specification, as required by MPEP 2111, the meaning of the above claim language is quite clear. Applicants respectfully request that the Examiner withdraw the objection.

Grating has Symmetry

The Office Action further objected to the phrase “a grating has symmetry” in claim 31 on the basis that it is “vague since it is not clear what is the symmetry about or what is being symmetric.” Applicants disagree with the Office Action in this respect and respectfully traverse the objection. To advance prosecution, Applicants have amended claim 31 as discussed below. The objection is traversed on the following basis. Claim 31 recites “wherein the diffractive element comprises a grating having symmetry.” 37 C.F.R. 1.75 requires that a dependent claim refer back to and further limit another claim in the application. Claim 31 properly refers back to claim 25 and further limits claim 25 by further defining the “diffractive element” to comprise “a grating having symmetry.” These limitations are clear to one of ordinary skill in the art. Claim 31 is not indefinite in scope and the Office Action has cited nothing in patent statute or patent rules that requires amendment to claim 31 to recite “what is the symmetry about or what is being symmetric.” The claimed grating has symmetry as opposed to being asymmetric. Applicants have amended claim 31 without prejudice or disclaimer and reserve the right to prosecute similar or identical claims in future continuing applications.

To advance prosecution, Applicants have amended claim 31 to recite the limitations “wherein the diffractive element comprises a grating having rotational symmetry about an optical axis of the main optics.” This amendment is supported throughout the application as originally filed, for example, at paragraph 0014 of the application as published. No new matter has been added. Applicants respectfully request that the Examiner withdraw the objection.

Optically Effective Surface

The Office Action further objected to the phrase “optically effective surface” recited in claim 37, stating “it is confusing since it is not clear what is considered to be optically effective, any interface between elements that have different refractive index will affect the light optically”. While this may be a true statement, it does not render the term “optically effective surface” to be confusing and certainly not to be indefinite. Upon reading the specification, it is clear to one of ordinary skill in the art that the claim’s reference to placing the diffractive element on an optically effective surface *of a refractive optical element* of the main optics when read in context and in light of the specification, indicates that the refractive element is positioned on an optically effective surface *of a refractive optical element* as opposed to being included in a free standing independent optically element of its own. Further Applicants have amended claim 37 based on discussions in the interviews to recite “the diffractive element is disposed on a surface of a refractive optical element of the main optics.” Further, to advance prosecution, Applicants have amended claim 37 to recite “wherein the diffractive element is disposed on a surface of a refractive optical element of the main optics.” Applicants respectfully request that the Examiner withdraw the objection.

Optimizing the Transmissive Diffractive Element

The Office Action objected to the phrase “optimizing the transmissive diffractive element” and indicated that it is “confusing since it is not clear what is being optimized here.” Applicant respectfully traverses the objection. Applicants take the position that reading the remainder of claim 53 makes quite clear what is being optimized particularly in context of the written description. Claim 53 recites “optimizing the transmissive diffractive element *with regard to its phase function such that at least one aberration of the main optics is corrected by the diffractive effect of the diffractive element for an inspection radiation.*” It is readily apparent

to one of ordinary skill in the art that what is being optimized is “the diffractive element” and that it is being optimized “*with regard to its phase function such that at least one aberration of the main optics is corrected by the diffractive effect of the diffractive element for an inspection radiation.*” In context of the rest of the claim language and the written description in the specification “inspection radiation” has a markedly different wavelength than that of the “observation radiation.” Applicants respectfully request that the Examiner withdraw the objection.

Applicants further traverses the objection to the claims’ alleged informalities on the basis that it is not supported by in the patent statute (Title 35 U.S.C.) or the patent rules (37 C.F.R.) If the Examiner take the position that claim terms are indefinite, Applicants respectfully request that the Examiner make a rejection under Section 112 of the patent statute. Applicants know of no legal standard by which to judge whether a claim term is “confusing” and such an objection unfairly forces Applicants to respond to meet a standard that is not defined in law. Such a standard is arbitrary and cannot be met. Applicant respectfully submits that the claim terms objected to, are not indefinite and are clearly understandable by one of ordinary skill in the art when read in light of the specification of the application as filed. Applicants respectfully request that the Examiner withdraw the objections.

Drawings

The Office Action objected to the drawings under 37 C.F.R. § 1.83(a). By this amendment, Applicants submit drawings depicting the structures claimed that the Examiner has requested. The drawings and the amendments to the “Brief Description of the Drawings” are fully supported in the specification and claims as originally filed and no new matter has been added. Applicants respectfully request that the Examiner withdraw the rejection.

Claim Rejections – 35 U.S.C. § 102

The Office Action rejected claims 25-27, 36, 40-41 and 50-51 under 35 U.S.C § 102(b) as being anticipated by the patent issued to Kashima (U.S. 5,631,779). Kashima does not teach all of the limitations of the claims pending in the present application. Kashima teaches the use of a diffractive element to correct chromatic aberration in a broad wavelength range. For example, Kashima indicates at Col. 18, lines 22-24 that radiation from the near ultraviolet region to the visible region is corrected. In Kashima, the use of a diffractive element having anomalous dispersion characteristics allows for avoidance of the use of anomalous dispersion glass materials which are expensive and can hardly be polished. Col. 4, lines 5-7. However, the present invention, as claimed, is not directed to the use of a diffractive element to correct chromatic aberration over wide wavelength range. In the present invention, the diffractive element corrects “at least one aberration of the main optics . . . for an inspection radiation” while it “does not substantially change the imaging properties of the main optics for the observation radiation.” As described in the specification the “observation radiation” is typically in the ultraviolet wavelengths. At the same time, the present invention, as claimed, compensates for chromatic aberration of the inspection radiation, which according to the specification is commonly in the wavelength of 650 to 820 nanometers. The use of the claimed invention greatly simplifies the optical requirements and allows for the benefit of a less expensive simpler instrument. As described in the specification, this is achieved by designing the diffractive element such that the diffraction efficiencies for the observation radiation is as small as possible and the diffraction efficiency for the inspection radiation is as large as possible. Also according to the invention as claimed, the diffractive element can be optically uncoupled from the imaging optics for the

observation radiation so that the diffractive element can be removed from the imaging optics and the imaging optics can still be used for the observation radiation.

A further benefit of the invention is that the diffractive element can be added to an already existing imaging optics. Thus, Kashima does not disclose or suggest all of the limitations of the invention as presently claimed. Applicants respectfully request that the Examiner withdraw the rejection.

The Office Action also indicates “with regard to claim 26, it is implicitly true that the diffractive element does not substantially change the imaging properties of the main optics for the observation radiation.” Initially, this is a conclusory statement for which no evidence has been shown. Secondly, nothing in the section 102 of the patent statute or the patent rules supports a rejection for anticipation on the basis of any statement being “implicitly true.”

If by this statement the Examiner intends to take an official notice of facts, Applicants respectfully traverse this assertion and require that the basis for this assertion be stated and a reference cited to substantiate this assertion or that the Examiner execute a declaration or affidavit if personal knowledge forms the basis for the rejection. See, M.P.E.P. § 2144.03. ("The Examiner may take official notice of facts outside of the record which are capable of instant and unquestionable demonstration as being "well- known" in the art. ...If the Applicant traverses such an assertion the Examiner should cite a reference in support of his or her position.").

If by this language the Examiner intends to make an argument for inherency, Applicants respectfully traverse the argument and requests that the Examiner explain clearly the basis for this assertion. Applicants note that the Court of Appeals for the Federal Circuit has held “To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.” The court continued “Inherency, however, may not be established by

probabilities or possibilities. *The mere fact that a certain thing may result from a given set of circumstances is not sufficient.*” (emphasis added) In re Robertson, 169 F.3d 743, 745 (Fed. Cir. 1999). Applicants thus respectfully point out that a *prima facie* case of anticipation has not been established, and respectfully request the Examiner to reconsider and withdraw this rejection.

Similarly, the Office Action indicates “with regard to claim 27, it is implicitly true that it is non-zero order diffracted light that corrects the aberrations.” Again, Applicant objects to this rejection on the basis that nothing in the patent statute supports a rejection of claims based on the grounds that “it is implicitly true”. Again, if by this statement the Examiner intends to take an official notice of facts, Applicants respectfully traverse this assertion and require that the basis for this assertion be stated and a reference cited to substantiate this assertion or that the Examiner execute a declaration or affidavit if personal knowledge forms the basis for the rejection. If by this language the Examiner intends to make an argument for inherency, Applicants respectfully traverse the argument and requests that the Examiner explain clearly the basis for this assertion. Applicants thus respectfully point out that a *prima facie* case of anticipation has not been established, and respectfully request the Examiner to reconsider and withdraw this rejection.

Claim Rejections – 35 U.S.C. § 103

The Office Action rejected claims 28-29, 38 and 42 under 35 U.S.C. § 103(a) as being unpatentable over the Kashima. With regard to claims 28-29, the Office Action admits that the reference does not teach or suggest that the diffraction efficiency for the zero order of diffraction for the observation radiation is 80% and is greater than the sum of all other orders. The Office Action goes on to allege “however it is known in the art to design the diffractive element to have desired diffraction efficiency for different diffraction orders”, (i.e., this is done with respect to basic diffraction theory.) No evidence to support this statement is provided. Applicants respectfully traverse this assertion and require that the basis for this assertion be stated with a

reference cited to substantiate this assertion or that the Examiner executed declaration or affidavit of personal knowledge forms the basis for the rejection. Applicants respectfully note that a *prima facie* case of obviousness has not been established and respectfully request that the Examiner reconsider and withdraw the rejection.

With regard to claim 38, the Office Action states “it is an obvious modification to one skilled in the art to make the diffractive element positioned in the annular region for the benefit of making the lens system utilizes mainly the central annual portion of the radiation beam.” No evidence to support this conclusory statement is provided. Applicants respectfully traverse this assertion and require that the basis for this assertion be stated with a reference cited to substantiate this assertion or that the Examiner executed a declaration or affidavit if personal knowledge forms the basis for the rejection. Applicants respectfully note that a *prima facie* case of obviousness has not been established and respectfully request that the Examiner reconsider and withdraw the rejection.

With regard to claim 42, the Office Action indicates “it would have been obvious to one skilled in the art to arrange the diffractive element at the region that the observation radiation has the greatest beam diameter for optimal operation.” No evidence to support this conclusion is provided. Applicants respectfully traverse this assertion and require that the basis for this assertion be stated with a reference cited to substantiate this assertion or that the Examiner executed declaration or affidavit of personal knowledge forms the basis for the rejection. Applicants respectfully note that a *prima facie* case of obviousness has not been established and respectfully request that the Examiner reconsider and withdraw the rejection.

As indicated above, claims 37, 39 and 43-49 depend directly or indirectly from claim 25 and are patentable for at least the same reasons as claim 25. With regard to the rejections of these claims, the rejections are traversed without specifically being argued in view of the

patentability of the independent claims from which these claims depend. Applicants respectfully request that the Examiner withdraw the rejection.

New claims 54, 56 and 57 depend directly or indirectly from claim 25 and should be patentable for at least the same reasons as claim 25. New claims 55, 58 and 59 depend directly or indirectly from claim 53 and should be patentable for at least the same reasons as claim 53. Claims 54-59 are supported throughout the application as originally filed, for example at paragraphs 0002 through 0004 and 0043 of the application as published. No new matter has been added.

Interview Summary

Applicants thank the Examiner for her time and courtesy in the telephone interview on December 16, 2008. Claims 25-53 were discussed and a proposal to amend claims 25-53 was discussed.

In view of the foregoing, it is submitted that this application is in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'P. Onderick', with a long horizontal flourish extending to the right.

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